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HASSALL (R.)

CHOLERA:

ITS NATURE AND TREATMENT;

AND

THE PREVENTIVE MEASURES COMMUNITIES
AND INDIVIDUALS SHOULD ADOPT.

BY

RICHARD HASSALL, M.D., &c.

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"Poverty, filth, bad drainage, crowded hovels, long hours in unventilated shops, do not create it; but they draw it down as an iron-conductor draws down the lightning; they nurse, and feed, and strengthen it, till it goes forth from the hovels of the poor into the halls of the great, conquering and to conquer, with terrible and disastrous success. It is a taint in the air, a poison of universal agency. It is diluted at present, and has been diluted since 1849; but it is not spent; it has come back with concentrated force in 1853."—DR. CUMMING.

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INTRODUCTION.

WHEN the Cholera invaded this country in 1832, it destroyed 5272 persons in London and its vicinity. In the country it destroyed 26,101. The total deaths in Great Britain were therefore 31,373. In Ireland it was even more fatal in proportion to the population. In that portion of the kingdom 21,171 persons perished by the pestilence. That the numbers stated are below the truth is absolutely certain. At that period the admirable Registration Act was not in operation. The returns procured by the Board of Health in 1832 were voluntary, partial, and evidently defective.

During the visitation of 1848-9, a visitation still fresh in the memory, the Cholera swept away 54,398 of the inhabitants of England. In the same period 18,887 persons died of the allied disease diarrhœa. If we presume that Cholera is fatal in the proportion of one half of those attacked; then we may compute that about 160,000 persons were attacked during this visitation.

If we examine this subject more closely we shall find that a very large portion of the population was altogether exempt. It follows as a necessary consequence that the weight of the scourge was chiefly borne by a section only. Taking the percentage of deaths upon the aggregate population, the proportion, however really afflicting, may seem comparatively light; but when we reflect that the estimate must be made upon limited sections of the community, then the proportionate mortality will appear heavy indeed.

The same sections of the community that suffered in 1832 and 1849 will in all human probability suffer again in every succeeding epidemic. It especially concerns those districts which the Cholera seems to have marked for its own to be on the alert; to take promptly and vigorously every precaution which experience and science have pointed out as useful in diminishing or counteracting the spread of the disease. True it is that the devastation caused by a pestilence such as that we have witnessed cannot be limited to those districts of the

kingdom where it rages ; true it is that the whole country is wounded, the national prosperity endangered, by the injury of the part, but it is not the less true that the duty of timely and active exertions presses with tenfold urgency upon those districts where the Cholera threatens to take up its abode, and which will undoubtedly bear the first blow, and suffer the greatest distress.

It is in the earnest hope, in the first place, of rousing the proper spirit of exertion ; and, secondly, of being able to point out what it may be most useful to do, that I have been induced to pen the following pages.

It can never be often enough repeated that *the Cholera is a preventible disease*. It, therefore, behoves us to look the danger well in the face. By a careful study of its nature, its mode of attack and spread, its cause, and the means which have been found most useful in controlling its march amongst the inhabitants of a district, as well as those which are proper to be used in the treatment of individuals attacked, we shall be better prepared to understand the measures which a threatened community ought to take. There is nothing so mischievous or so reprehensible as popular writings upon the nature and treatment of ordinary diseases. Ordinary diseases affect individuals. The office of the medical practitioner is by the appliances of art to lead those individuals back to health. In the case of a widely spreading disease like the Cholera, the medical practitioner has a larger duty. It is his business, *it becomes his duty to instruct the public*, to show them how to meet the approaching pestilence. It is in every man's power to do something individually to render himself and the neighbourhood in which he lives less open to the invasion of the epidemic. It is especially in the power of every community by well-concerted measures to do much to disarm it of its sting. Actuated by these feelings it will be my purpose in what follows to put in as clear a light as possible what we know of the Cholera, and to insist upon those general and individual measures, which my own experience and intimate knowledge of the locality of Richmond in its sanitary aspect, point out to me as necessary to be taken.

R. H.

Richmond, May, 1854.

THE CHOLERA:

ITS NATURE AND TREATMENT.

History of Cholera.—It is commonly believed that the Cholera is a disease, if not of modern origin, at any rate unknown in former times. It appears to me, however, highly probable that those authors are not altogether in error who have observed certain points of resemblance between this disease and various epidemics recorded in history.

The opinion that the Cholera is not a disease peculiar to recent times has been lucidly stated by Dr. Chambers in some lectures published in the *Lancet* in February 1849, but delivered at St. George's Hospital at the time of the first epidemic in 1832. This accomplished physician says:—"The disease which has been lately so extensively fatal throughout the civilized world is no new one; as far as any two diseases prevalent in different countries, or occurring in different individuals can be considered identical, it is the same as that which has been recorded by Hippocrates as raging at intervals in Athens and Thrasos; by Aretæus in Asia Minor; by Celsus, Galen, and Aurelian at Rome; at Bagdad by Avicenna; by Bontius, by Paisley, by Girdlestone, by Curtis, and innumerable modern observers, in India and China. I believe, in short, with Mr. Jamieson, the able author of the Bengal Report, that the disease which has of late created such a widespread panic throughout the world is, to use his words, '*unquestionably* the Cholera Morbus of Sydenham, the Cholera Spontanea of Sauvages, the spasmodic Cholera, cramp, or *mort de chien* of Curtis.'" Dr. Chambers supports his opinions by the most precise references to the writings of the ancient physicians and historians quoted.

It has always struck me forcibly that the great plague which attacked the Athenians some 500 years before Christ bore a strong resemblance, both in its mode of progression, and in many of its symptoms, to Asiatic Cholera. I take the following extracts from the historian Thucydides:—"The contagion is said to have had its origin in that part of Ethiopia which is situated beyond Egypt, and from thence to have passed into Egypt and Lybia. After spreading over a considerable part of the King of Persia's dominions, it at length broke out suddenly at Athens, and made its first attack in the Piræus, where it was reported that the Peloponnesians had thrown poison into the wells; for as yet there were no fountains there. Afterwards it extended itself to the upper city, and then the mortality rapidly increased. And now I leave every one (whether physician or other) to pass his own opinion concerning it, pointing out from whence it was likely to arise, and what cause he thinks sufficient to produce so entire a change of the constitution of the human body. For my own part I shall merely relate the manner of it; and having been myself sick of it, and seen others afflicted, I shall point out those symptoms of the malady, from a consideration of which any one may have some previous knowledge of it, and not be altogether ignorant of its nature, should it ever again make its appearance.

"The season of the year I speak of is admitted to have been singularly healthy as far as regarded other disorders; nay, if any one previously laboured under any malady it merged and terminated in this. Others, without any apparent cause, on a sudden, and when in perfect health, were attacked; it excited vomiting, inducing what physicians call discharges of bile, and those attended with excessive torment. This was, in most cases, succeeded by a dry empty hiccough, accompanied with strong colicky convulsions and spasms; in some cases immediately ceasing, in others of longer duration. The body did not externally feel very hot to the touch, nor was the skin pallid, but reddish and livid. But so burnt up were the internal parts that the patients could not bear the lightest clothing or the finest sheets to be thrown over them, nor endure to be otherwise than stark naked; nay, they would most gladly have plunged into cold water. Indeed many of those who were not

attended to did so, precipitating themselves into wells, urged by thirst insatiable; and whether they drank much or little it was the same. A restlessness and wakefulness likewise perpetually oppressed them; and so long as the disorder was at its height the body did not fall away, but resisted the malady beyond all expectation; so that either they died (most of them on the ninth or the seventh day of the inward fever), while yet in possession of some strength, or if they escaped [that crisis] then the disorder, descending into the bowels, affected them with violent and excessive diarrhœa, by which they afterwards were carried off through weakness."

Before the date of the great epidemic, in 1817, several partial epidemics of Cholera had occurred in India. It would seem as if these partial epidemics were the first struggles made by the pestilence to gain a footing in India. Having achieved this footing in 1817, the Cholera gradually extended its ravages from the banks of the Ganges, gaining more and more territory as it advanced, and, in the course of years, encircling and desolating the globe. Starting from Bengal in August, 1817, it reached Bombay on the 10th August, 1818. On the 18th September, 1823, it made its way to Astracan; and there the epidemic appears, for a time, to have died away. In June, 1830, however, it broke out again on the low western shores of the Caspian Sea. Astracan again saw the revival of the Cholera in July. This appears to have been the centre whence the disease made its fearful irruption into Europe. Moscow was seized in September of the same year. In June, 1831, it was at St. Petersburg. At the end of August it attacked Berlin, and Hamburg in October. The coast of Britain was invaded at Sunderland on the 24th October, 1831; and Edinburgh felt the storm in January following. In the course of 1832 and 1833, the pestilence ruled over the land. At length it passed away. People began to hope that this country had only suffered from a casual invasion by a disease which, as it was before unknown, might never return. Many believed that the Cholera was in its nature, as well as in its name, essentially "Asiatic." Subsequent experience, however, must effectually dispel this fatal error.

In 1838, a singular event occurred, which proves to demonstration that Cholera may *originate* in England as well as in

Bengal. The House-of-Industry at Coventry suffered a sudden and severe outbreak of Cholera, and fifty-five of the inmates were destroyed. Fortunately, it ended where it began; the town escaped.

Since the authentic re-appearance of the disease in 1817, it is highly probable that it has never altogether disappeared—the fire has always been smouldering, and not seldom bursting into flames. After passing over England and Ireland in 1833, it died away for a time. But, in 1845, it was again lighted up in Cabul, and we again had warning of what was coming. In the spring of 1846, Bombay was attacked, and a part of the army of Scinde, at Kurrachee, was assailed by the disease in its most fatal forms. Persia and Syria were attacked before the close of the same year. Again it reached Astracan, seated at the mouth of the Volga on the Caspian Sea. This was in June, 1847. Moscow was struck in the September following. Petersburg and Berlin capitulated in June, 1848. In September of the same year, Hamburgh was attacked, and Edinburgh in the beginning of October. Still the disease was called the “Asiatic Cholera,” although it had again asserted and made good its right to a footing on our soil. The second onslaught was even more fatal than the first. A third time it has invaded the shores of England. Newcastle has felt the first blow. For a time the virulence of the disease seemed to be exhausted there. But the past history of Cholera scarcely leaves a reasonable doubt that, as it has done its work at Newcastle, so other towns will suffer in their turn. In London, the centre, as it has been called by the Registrar-General, of a great Cholera-field, the disease is slowly but surely following the same course as it did in 1848-9; and we may calculate that, next summer, it will rage with increased violence.

Who can now shut his eyes to the truth of the following striking remark in a leading article of the *Lancet*? “The Cholera is no longer ‘Asiatic;’ it has asserted an almost equal right to be called ‘European.’ Even that name, which has heretofore been employed to distinguish the ordinary autumnal diarrhoea of this country from the more terrible exotic disease has now lost its appropriateness. The Cholera is not only Asiatic and European, it is *English* also.”

Is it not, then, clear to all, that no time is to be lost in using every means—each individual according to his opportunities, and each section of the community according to its power—to render the country as little exposed to the spread and occupation of the Cholera as possible?

Richmond belongs to the great London Cholera-field. It felt the attack in 1832, when London was invaded; and again, in 1849, Richmond, Kingston, Mortlake, and the surrounding district, suffered in like manner. Much was then done by the Richmond Sanitary Committee in removing the more obvious conditions which are known to lend strength to the disease. *This work has begun again.* But we are now resting on our oars at a time when we should be most active. The Board should sit weekly: the work so well begun should be perseveringly pursued.

Causes.—The essential cause of Cholera is obscure, and must probably remain so. Many theories have sprung up, and have been successively disproved. One ingenious writer, Mr. Parkin, attributes it to volcanic agency, and ascribes it to the influence of poisonous elements generated in subterraneous reservoirs, and diffused in the surrounding atmosphere. It may be observed that the gases which escape from volcanoes have been analyzed, but the poisonous element has not been identified or detected in places suffering from Cholera, nor is it true that any visible volcanic phenomena have coincided with the outbreaks of Cholera. It has been advanced that electricity is the cause. Many examples of thunder-storms and great electrical disturbances have indeed been noted in the epidemic years; but similar disturbances have happened in other years.

Schönbein, an ingenious chemist, has attempted to explain that electricity acts by modifying some of the constituents of the atmosphere, producing an odoriferous matter which he calls *ozone*. He believes that the animal matters thrown into the atmosphere are decomposed by this ozone. Hence it has been argued that a deficiency of ozone was the cause of Cholera. Drs. Swayne and Brittain, of Bristol, thought they had discovered the cause of Cholera in a minute *fungus* which was met with in the air and the water in infected localities. Dr. Snow, again, has brought together a mass of facts to show that Cholera is propagated through the medium of the water drunk. He

contents that the water is contaminated by the offscourings of the alimentary canal, and that in this contamination is contained the seed of Cholera. This is positively certain—that in many districts where Cholera was most rife, the water used was drawn from wells into which cesspools drained. All London is supplied from the Thames, which is notoriously little better than a common sewer, and the Cholera is chiefly fatal along its banks. Newcastle escaped with comparative impunity in 1849: it was then supplied with comparatively pure water; in 1853 it suffered fearfully, and now it is said the water is mainly drawn from the Tyne, a river about as foul as the Thames at London. Now, it is undoubtedly true that, in all the localities infected by Cholera, and at the same supplied with diluted sewerage instead of wholesome water, other causes lending actively to the disease were also in operation; but it cannot be denied that the connexion between Cholera and bad water is well enough established to urge us to the most scrupulous care in obtaining water that is pure.

It will be remembered that in the worst districts of Richmond, in 1849, *cesspools and wells were found side by side*. At the time of the last visitation I examined the quality of the water, and the condition of the supply at Richmond; and I drew up a report upon the subject. I have been made acquainted with a forcible illustration of the importance of this question. In the town of Ipswich almost all the conditions most favourable to the development and spread of Cholera abound; but it has one advantage, which experience has shown to be powerful enough to neutralize them all. It has an abundant and constant supply of the purest water. Every cottage has a tap; and thus every particle of refuse matter is instantly carried away. There can be no accumulation. Thus Ipswich, a low-lying town on a tidal river, has escaped the Cholera.

Nature of Cholera; its resemblance to Ague.—My own observation of the symptoms of Cholera lead me trace a strong analogy between Cholera and ague. This view has been ably advocated by Dr. Billing. There is an obvious similitude between the cold stages of ague and Cholera. In both there is the cold surface, shrivelled skin, livid face, crampy pains in the limbs, headache. In ague, as in Cholera, there is not unfrequently vomiting and diarrhœa. Both diseases are liable to

be followed by fever of a low or typhoid character. In both there is the same tendency to internal venous congestions. It can scarcely be doubted that both owe their origin to similar influences.*

Exciting Causes.—Although the Cholera has undoubtedly attacked persons of temperate habits, and otherwise apparently not exposed to the ordinary causes of disease, yet it is certain that good livers, and persons inhabiting airy and elevated positions, are very rarely affected. Foremost among the immediately exciting causes must be ranked intemperance. It has been observed in infected localities that a fit of drunkenness has been constantly followed by an attack of Cholera. Everything that depresses the vital energies contributes powerfully to the production of the disease. Insufficient clothing, exposure to damp, foul air, insufficient food, food of bad quality, are among the most unfavourable conditions. These are some of the causes which operate directly upon individuals. There are others which affect localities, and render all the inhabitants more ready victims to the disease. Low-lying situations, especially on the border of rivers or stagnant water, where the drainage is bad, where the water is impure, the air confined, the habitations crowded and filthy, are the favourite abodes not only of Cholera but of every kindred form of sickness. Further than this: in those districts known to be favourable to disease, particular spots more foul than the rest, where the sources of impurity are most concentrated, may be pointed out beforehand as those spots where the Cholera when it comes will most certainly rage.

Is the Cholera contagious?—Can the Cholera be propagated from person to person? No question has been more keenly, and even rancorously, contested than this. It is well known that the Board of Health at one time answered the question in the most absolute negative. And yet how can we, without admitting contagion, account for many familiar and well authen-

* I have lately learned that Dr. Crauford, an able medical officer of the Indian Navy, has adopted this view, and has accordingly acted upon it in practice. His treatment of Cholera in Burmah during the recent war consisted mainly in the free administration of quinine; and I have it from good authority, that he has met with much greater success than was known under other modes of treatment.

ticated facts? When Cholera broke out at Drouet's Infant-Poor Institution at Tooting, many of the children were, through the liberal humanity of the committee, removed into the Royal Free Hospital in London, situated several miles from Tooting. Several of the attendants at the hospital were seized with Cholera, and yet there was at that time no case in the neighbourhood! Instances of persons living at a distance from infected localities, who were employed to wash the clothes of Cholera patients, who were attacked are numerous. The following circumstance came under my own observation during the epidemic of 1853:—A woman died of Cholera. She had been nursed by her mother and sister. These women removed to another residence, half a mile off, taking with them some of the clothes to wash. On the second or third day, the sister, a strong, healthy woman, was attacked and died. The mother had a mild attack and recovered.

In what other way, if not by contagion, is the following history to be explained?

“Halling Vicarage, near Rochester,

“Jan. 30, 1854.

“MY DEAR SIR,—I hasten to give you, as far as I am able to do so, an account of the cases of Cholera which occurred in the neighbouring parish of Euxton, in, I believe, the November of last year.

“The first person seized was a young man named George Crowhurst. This man had long been living in London, and was employed while there in collecting and shipping manure, but went occasionally to Euxton with a barge, which he there unladed. It was while engaged at this latter work at Euxton, that he was seized with Cholera, and died at his master's house, (whither he was taken, and which was close at hand) at the expiration of two days. Hardly was the son dead, when the mother was seized; and so quickly in her case did the disease do its work, that she was a corpse within twenty-two hours after she was attacked. Within a few (I don't know how many) days after this, a little girl was seized, and soon died, in the immediately adjoining cottage. These were the only cases in the parish. They occurred on the same spot, and nearly at the same time, circumstances which seem to me to afford strong

presumptive evidence that the two last-mentioned cases were from infection or contagion. I have not heard whether or not the little girl went into the adjoining cottage, but I think it very likely she may have done so.

"I am, dear Sir, yours very truly,

"J. NALSON.

"DR. HASSALL.

"P.S. Since writing the foregoing, I have been informed that the father of the young man, Crowhurst, was seized with Cholera, and was for some time ill, but eventually recovered."

The following interesting account, supplied to me by a distinguished officer, also illustrates the point in question, as well as other important features of the disease:

"About the month of February, 1846, when proceeding from Western India to the Upper Provinces with my regiment, we were several times during that long march attacked by Cholera; and I have still a lively recollection of some of the circumstances connected with one of those attacks.

"On taking up our ground shortly after daybreak for encampment near a small village of not more than a dozen huts, called Sindwah or Palasneer, to the best of my recollection, and which ground was generally used for the same purpose by the troops marching in the same direction as ourselves, we at first sight thought the spot appeared most eligible for us, but the troops had no sooner began to prepare in the usual way to make things straight for the day, than it was remarked by many as well as myself, that the air appeared to be impregnated with a very noxious smell, from some cause not at the moment to be accounted for. Shortly after this, and at a very short distance from our ground, a small pony or tattoo, as they are called in India, was found in almost the last agonies of death from putrefaction, where it had been left to die by the owner, as the natives never think of putting any animal to death under such circumstances. We were told that the poor thing had been attacked by a tiger about a week before, which had nearly torn off one of its hind-quarters. Not long after this, one of our married officers was assisting to pitch his tent, so as to get his wife out of the sun as soon as possible, when all of a sudden

the earth under the tent-pole gave way, and it sunk into a mass of putrid substance, which turned out to be the remains of some Sepoys, who had, as we were informed by the natives, died of Cholera a short time before. About the same time, our baggage began to arrive on the ground, together with the sick and hospital establishment, and shortly after, if I mistake not, two or three cases of Cholera broke out amongst the sick men. Before these discoveries were made, the greater part of the troops were away watering the horses some three miles off, but the nearest water to be got at. And on their return, no time was lost in getting away from that horrible spot, moving on about three or four miles to a little rising ground, where we remained for the day. The ground near the village we left was low and flat, and the last crops grown upon it were rice, to the best of my recollection. By the same evening, Cholera had again fairly got hold of us, and three or five men were buried that day.

"As soon as the sun was sufficiently low in the evening for us to move on again, we did so, and continued the march until near daylight the following morning, when we reached some high ground, having in the course of the night ascended a ghaut, the name of which I do not now recollect. Here we halted for three or four days, during which all the cases began to improve very fast, and for a while, if I mistake not, we kept clear of further cases."

London, February 5, 1854.

The Board of Health at one time declared Cholera not to be infectious, but in a recent letter from that Board I find that they admit "Cholera to be, under certain circumstances, very catching." The following case, for which I am indebted to a very able and experienced medical practitioner—Mr. Cooper, of Brentford—is so remarkable in its details, and bears so strongly on the question of contagion, that I will content myself by simply detailing it:—

"Mr. Gibson, of Old Brentford, was attacked with Asiatic Cholera 31st August, 1849, and died in twelve hours, having suffered for twelve days previously from diarrhœa. Opposite the house was an open sewer and gully, a large cistern containing decayed animal and vegetable matter in a most offensive

state. The water was not used by the family. Mrs. Gibson, wife of the above, left the house forthwith at the suggestion of Mr. Cooper,—*i. e.*, on the evening of the 31st August. Feeling anxious and distressed, she returned next morning, again left in the evening, returning once more on the following day, when she was seized with Cholera, and died in fifteen hours. The nurse, Sarah Stanney, an unmarried woman, now left the house, and removed to the "Catherine Wheel," Wheel-yard, at New Brentford: she was immediately attacked by Cholera, and died in sixteen hours. Sarah Stanney, a married woman, and sister-in-law of the above, washed the clothes and attended to her relative. She was also seized, and died in sixteen hours, never having been at Mr. Gibson's house. Ann Poole, a servant of Mr. Gibson, after the death of her master and mistress, went to her home near the "One Tun" inn, was seized with Cholera, and died in sixteen hours. William Poole, to whose house she was taken, was seized, and died in sixteen hours. Esther Poole, wife of William Poole, was attacked, but recovered. Mrs. Shearman, also employed as a second nurse to Mr. and Mrs. Gibson, had an attack, and recovered. Allen Horner, who carried the servant and clothes to her home, was also attacked, but recovered."

There is a consideration which argues strongly, to my mind, in support of the theory of contagion. There is no fact better ascertained than that crowding Cholera patients together so increases the intensity of the poison as to render the spot in which the patients are so crowded highly dangerous to those not infected. Now, it is clear that this danger is simply owing to the greater virulence acquired by concentration. If this be so, why is it so improbable that the morbid poison of one individual may be powerful enough to affect a second person predisposed to the disease? At the same time, I am ready to admit that propagation by contagion from person to person can never account for the rapid spread of the disease, and the almost simultaneous manner in which large districts widely separated are occasionally attacked. The danger of contagion, then, is infinitely less than that of being brought within the influence of the more general laws which govern the diffusion of Cholera.

It yet deserves to be remembered that, in St. Petersburg,

out of 500 medical men, eleven died of Cholera: that is more than one out of fifty. The mortality among the officers of the army in a long campaign is seldom greater than this. During the recent attack at Newcastle, also, no less than three medical men perished in consequence of their devotion to the public service.

Premonitory Symptoms and Early Progress.—It is decidedly erroneous to assert that the invasion of Cholera is invariably preceded by premonitory symptoms, however true it may be to state that premonitory symptoms do appear in by far the greater number of instances. These are the most favourable cases; they represent the milder form of the attack, and are the most within reach of treatment. The most fatal form is that in which there is no warning, in which the patient seems to be struck down at once by the intensity of the poison.

In 1849, a man and three children died of Cholera at Mortlake. They were seized with cramps, and passed rapidly into a state of collapse. This was not preceded by any amount of purging or vomiting. In India, where the disease is more violent, this form is not unfrequent. Men have been known to drop down suddenly while on parade; and cases are even recorded of persons dying within a few hours from the appearance of the first symptoms, no purging at all having occurred.

When purging and vomiting occur, I believe that a less virulent attack is indicated. The system is not so far prostrated as to be unequal to the effort to throw off the circulating poison. The vomiting and purging are the modes which nature adopts for this purpose; and within certain limits, which must, however, be carefully watched and preserved, they may operate beneficially. Hence, I look upon it as irrational—and I am sure I have seen the mischief of the practice—to check at once, and suddenly, every appearance of diarrhœa by the administration of large doses of laudanum.

Treatment of the Premonitory Diarrhœa.—The premonitory symptoms may last from two to eight days. They usually consist in languor and disturbance of the digestive organs, as flatulence, nausea, and diarrhœa. Frequently this diarrhœa, after lasting a longer or shorter time, passes into unmistakeable Cholera rapidly and almost suddenly. Hence the urgent

necessity for early treatment. The stage of diarrhœa I have found to be capable of being treated with almost invariable success. The method I adopt is the following. In the milder forms of diarrhœa, and in the early stage, grey powder given three times a day, and saline draughts containing the citrate of potash, aided by appropriate regimen and general care, will usually prove sufficient. When the diarrhœa is more severe, then ten drops of dilute nitric acid, with not more than two drops of laudanum, given in frequency according to the urgency of the case, constitutes by far the most effectual remedy within my experience. To this it is proper to add strict attention to regimen; all solid food should be scrupulously avoided, *also all stimulants, as wine, beer, brandy, and peppers*, things too commonly resorted to in the first instance. This practice is frequently followed by irreparable mischief. The neglect in seeking at the onset, when judicious treatment is all important, for skilled advice, involves a loss of time, and permits of the insidious progress of the disease, which no skill at a later period may be able to control. The trust in popular nostrums engenders a delusive security which may be fatal. The most important condition is to *keep the surface of the body warm*. Good clothing is all-essential. The warm bath is of the greatest service. Absolute rest in bed is necessary. Bland liquids only should be taken.

The Stage of Invasion of Cholera.—The first stage of developed Cholera, whether following upon premonitory symptoms, or appearing suddenly, may be called the stage of invasion. This stage is commonly marked by diarrhœa and vomiting of the peculiar rice-water cholera-matter, cramps, and heavy burning paroxysms of pain in the region of the navel.

Treatment of the Stage of Invasion.—At this period of the disease treatment may still be most successful. *It is wrong to look upon Cholera as a disease which utterly baffles the skill of the medical practitioner. If taken in time medical treatment may be as useful and effectual as in other severe diseases.* But it must be resorted to at a period when the system can still answer to the action of remedies. The medical treatment of fever is undoubtedly successful; but it is not successful if commenced when the powers of nature are already exhausted, when the blood is coagulated, or has lost its vitality. It is not

reasonable, therefore, to reproach medicine with inefficiency because it fails in the cold stage of Cholera, when the powers of the system have already sunk under the violence of the disease. When there is collapse, when the blood is congealed in the great vessels, or reduced to a treacly consistence, would you hope to cure, not Cholera alone, but any other disease?

The treatment proper to adopt in the first stage is similar to that I have already recommended for the premonitory symptoms or diarrhœa.

The Cold Stage, or Collapse.—If the symptoms of the first stage are not soon relieved, the stage of collapse succeeds, or collapse and all the other symptoms of the cold or worst stage of Cholera may arise suddenly, not only without the milder premonitory signs, but even without the more marked symptoms of the period of invasion. Patients have been known to fall down into collapse as if struck by lightning. In this stage the extremities become ice-cold and blue; the skin wrinkled; the eyes fall back in the head, and are surrounded by deep-blue circles; the conjunctivæ are usually reddened—a proof of venous congestion; the voice is peculiarly small, fluty or reedy, and whispering; the urine is suppressed; the burning pain of the navel continues; there is incessant thirst; cramps, particularly in the extremities, are violent; the action of the heart is feeble in the extreme; there is every mark of intense internal congestion. This stage may last for a few hours only, or for two or three days. It is in this stage that the patient frequently dies. Even here, up to a certain point, treatment is eminently useful. So long as the collapse is not great, and the blood preserves a certain amount of vitality, the case is not hopeless.

A persevering attention to the following line of treatment will sometimes, even in apparently hopeless cases, be rewarded with success. Three great principles or indications of treatment must be sedulously kept in view. The system is overpowered by the intensity of the morbid element: it requires to be supported in the struggle; every effort must be used to aid the various excreting organs in eliminating the poison that oppresses the powers of life. The *first* and leading indication is to remove the patient from the spot where he imbibed the

seeds of the disease, where they are probably still rife, and where they may still, if he remains exposed to their influence, continue to act upon him, adding force to the blow which has oppressed him. The removal from a vitiated atmosphere to an airy apartment in a house situated on an elevated spot, places the patient at once in a condition favourable to recovery. But it is further important that the apartment be well ventilated and warm. The room should, therefore, be of ample size, with a good fire kept up in an open fireplace. In addition to this, I regard it as important to supply the air of the apartment abundantly and constantly with oxygen gas. For this purpose I recommend that an apparatus for generating oxygen be adapted to the fireplace. A simple iron retort, which may be charged when required with oxide of manganese and sulphuric acid, is all that is necessary. I insist upon this point, because, although I cannot go so far as a recent non-medical writer, in admitting that oxygen alone is *the* remedy for Cholera, I still hold it to be of great importance to afford a copious supply of a gas which is not only the great purifier of the atmosphere, but also an immediate agent in operating upon the disease.

It has been observed on dissection that the omentum is commonly intensely congested, and sometimes inflamed. It has been likened to a soldier's coat in appearance. I have found great benefit result from the application of turpentine epithems to the abdomen.

The *second* indication is to support the strength of the patient. This is most effectually done by the free administration of strong broth and beef-tea in the form of injections. I much prefer this method to giving food by the mouth alone—a greater quantity can be supplied, and with less annoyance to the patient. A plentiful proportion of common salt should be added to the broth injected.

The *third* indication is one deduced immediately from the view I entertain of the pathology of the disease. It is to relieve the great congestion of the internal organs, which, by disabling them from the performance of their functions, prevents the elimination of the choleraic poison. The means by which this indication is to be fulfilled are the following:—Everything must be done to restore the warmth of the external surface. The most ready and efficacious method of applying

local heat is by slacking quick-lime. For this purpose I recommend small lumps of lime to be sewn up in thick flannel bags, which are to be moistened with water and placed in the armpits, and to other parts of the body. By this means we obtain *both warmth and vapour*. The warmth is gradually given out, and the source of it can easily be renewed. The vapour is eminently useful in promoting the action of the skin. If the skin can be brought to act we shall have accomplished a great step towards relieving the congested kidneys.

At the same time that we are thus acting upon the skin other means may be employed to relieve the kidneys. Early cupping over the loins is a valuable and important remedy. When this has been done medicines will act with more freedom. The most useful medicines are salines; and the saline I prefer is the citrate of potash. One drachm of this salt should be dissolved in twelve ounces of water; and of this the patient may take as freely as he pleases, gallons if he craves for drink.

I would strongly urge that the attendance upon Cholera patients should not be left to a nurse. A competent medical practitioner should superintend the administration of the salines and enemata. Recovery will in many cases depend upon unremitting attention.

Before quitting this subject I would once more advert to the leading principle upon which alone a rational plan of treatment can be based. The practitioner may take for his guide in the treatment of Cholera what Sydenham has said of disease in general—"Morbum, quantumlibet ejus causæ humano corpori adversentur, nihil esse aliud quam Naturæ conamen, materiæ morbificæ exterminationem in ægri salutem omni ope molientis." Everything should be done to aid the system in throwing off the noxious elements. The bowels should not be locked up. The skin should be open. Enable the kidneys to secrete by relieving congestion. The lungs, the skin, the kidneys, may all do their part.

The Stage of Reaction.—Usually, if the powers of Nature, aided by medical skill, are able to carry the patient through the stage of collapse, a period of reaction ensues. The leading characters of this stage are intense internal congestion and fever. The skin becomes warmer, the heart's action is restored,

the pulse is stronger, the respiration quickened, the vomiting and diarrhœa and other symptoms of the blue stage subside. The suppression of the urine may give way. During recovery, with consecutive fever, there is nearly always *intense pain in the head*, noises in the head, flushed face, and a very sharp pulse, showing congestion of the brain. The tongue is very red; the evacuations are very dark, offensive, and often bloody. This reaction may end in recovery. To promote this happy termination the greatest vigilance and care are necessary. The slightest tax upon the little remaining strength of the patient may cause a relapse, and a relapse under such circumstances is almost invariably fatal.

The tendency to local congestions is very great; so much so that this, which may be called the congestive stage, may go on to constitute a distinct disease requiring special treatment. The local congestions most to be feared are those of the brain, the lungs, and the kidney. I would especially call attention to this last form of congestion, not only because it is not generally recognised, but also because it indicates that Nature follows a similar method in the elimination of the Cholera poison as it does in getting rid of other poisons. It is now known that congestion and inflammation of the kidney is a common occurrence in most cases of poisoning.

The treatment I have found most serviceable in this form of the disease consists in mild nutriments, quinine, and small bleedings.

Still more commonly, however, the fever of reaction passes into a fever of a typhoid character. The chief difference between this typhoid stage of Cholera and the ordinary typhoid fever consists in this: the irritation of the intestinal canal is less, and the oppression of the lungs and brain greater. The congestion of the central organs is a striking feature of this condition. It is indeed carried to so great a degree as to carry off the patient.

This congestive character is another feature marking the strong resemblance of Cholera to ague.

I will not dwell longer upon the medical treatment of Cholera, *firstly*, because this is a matter which *must* be intrusted to the sole care of the *medical practitioner*; *secondly*, because the medical treatment is a question *which concerns*

only the individuals actually attacked by the disease. The especial object of these pages is to enforce attention to those measures *which the community should carry out* with a view to the *prevention* of the disease.

I shall first of all consider the measures best calculated to effect this end ; and afterwards I shall direct special attention to the measures which it will be desirable to adopt during the actual prevalence of Cholera.

These measures are of two kinds:—*First*, Those general measures which fall to the community to carry out, and which have for their leading objects to put the district in the best possible sanitary condition ; to aid the poorer classes in improving their physical circumstances ; and to provide those means and appliances which will facilitate the treatment of the disease when it appears. *Secondly*, Those means of precaution and personal conduct which individuals should pursue to diminish the risk of attack.

As a first condition of carrying out effectually the recommendations which follow, *a proper organization is necessary.* The sanitary committee effected much good in Richmond in 1849, which it is obvious could not have been done without a combination of means, and the well-directed labour of many. A similar organization should be immediately instituted as *the first step.*

The most important general measures of the first kind are:—

A. The removal of all nuisances, such as animal and vegetable refuse. The filling up of foul ditches, cess-pools, or reservoirs of stagnant water, especially if in low situations. The draining those localities in the neighbourhood of dwellings where the soil is retentive, causing constant dampness of the atmosphere and impregnation with noisome gases.

The effect of good paving and draining is almost demonstrated by Mr. Holland. He found the rate of mortality in twenty streets of Chorlton-upon-Medlock, inhabited by about 3500 persons, had *fallen from 110 to 89 per annum*, after, and no doubt principally in consequence of the streets being properly paved and drained. Numerous other facts not less striking are known.

Another most essential measure is strict attention to prevent the befouling of the sources of the water employed for domes-

tic purposes, and the abandonment of those sources which cannot be kept pure.

In every house the water-cisterns should be periodically cleansed; wherever the water is not known to be pure *it should always be boiled* before being used for cooking or drinking. Boiling is the readiest and most certain way of freeing water from all organic contaminations.

The proper authorities should also put into vigorous operation all those proceedings sanctioned by the law for the prevention of the sale of decayed and unwholesome articles of food, and for ensuring the cleanliness and drainage of the town.

Wherever open ditches serve for sewers, and circumstances do not admit of their being filled up, then *pipe-drains should be laid at the bottom to carry away the sewage*. The contamination of the air would thus be to a great extent prevented.

The community may aid the poorer classes in many ways:—

B. The first condition is *to ascertain thoroughly their wants*. This can only be effected by house-to-house visitation. And by this I do not understand alone the regular daily calls of a medical practitioner, or of an inspector of nuisances. The service of these persons can only come into operation at a later period, or *but fulfil a part of what is absolutely requisite*. The most useful house-to-house visitation would be that which *may be set on foot forthwith*. It must be carried out, not by medical men alone, but by the laity. Organized committees of ladies and gentlemen acting in concert, and subdividing the town, placing districts under the special charge of visiting sub-committees, should *at once* be formed. The particular duties they should undertake, and the particular services they would render, would be the following:—

They would accomplish the first desideratum of learning the actual condition of the poor; and from this would follow the knowledge of what should be done.

They may by precept and encouragement urge the duties of cleanliness and temperance, and in many ways improve the moral as well as physical condition of the poor; and nothing which tends to either of these ends is unimportant not

only in a larger point of view, but directly, as it bears upon the prevention of cholera.

They should carefully inquire into the supply of fuel, warm clothing, and wholesome food. Timely aid in these respects, especially during the winter, when so many causes combine to distress the energies of the poor and impair their health, is of far more importance than can be easily imagined. It is the half-starved, the half-naked, and the badly housed that fall the readiest victims. The broken in health yield to pestilential influences which the well-fed and robust resist. If we can rescue our poorer neighbours from the debilitating influence attendant upon poverty and sickness, not only will much immediate good be effected, but when the Cholera comes it will find a population well prepared, and offering the fewest possible points open to attack.

I especially entreat the earnest attention of the wealthier classes to this point, because I am well persuaded that it is impossible to over-estimate its importance.

The community may further aid by affording every facility in the removal of filth and manure. They may provide, as in 1849, a covered cart with the necessary apparatus for cleaning out cess-pools, to be let gratuitously, or for a small sum. They may give lime and lend brushes for lime-whiting and purifying cottage-rooms and other purposes. They may supply disinfecting agents, of which I believe by far the most efficient is the solution of chloride of zinc. Soap and scrubbing-brushes should not be overlooked.

They may in many instances improve the general ventilation of confined localities. They may explain the use of, and assist in providing Arnott's ventilators in close rooms.

They may improve the healthiness of crowded habitations by withdrawing the children from them during the day-time into large and airy school-rooms. A most useful measure also would be to provide some easily accessible and convenient place where the poor might carry their dirty linen to wash. This should be supplied abundantly with good water and the other appliances necessary. The beneficial operation of the public baths and wash-houses in our large towns is too striking to be questioned. Such an establishment as I propose would not only accomplish much similar good, but viewed in imme-

diate relation to the present subject it would very greatly promote the general salubrity, by removing from the close dwelling-rooms of the poor a chief source of contamination, by affording more space, comfort, and freedom from damp, which cannot be obtained when the washing is carried on at home.

C. The foregoing measures are calculated to be of the most eminent service *before* the invasion of the epidemic, but they should not be abandoned when it shall have appeared. Further special measures remain to be adopted when diarrhœa, the forerunner of Cholera, and Cholera itself, prevail. The obvious and paramount want is, then, to place within the ready access of all, medical skill and medical appliances, so that not a moment need be lost before any case of a suspicious character is *observed and treated*.

It may happen, and, indeed, under many circumstances it will happen, that competent medical advice cannot always be immediately obtained on the first appearance of sickness. It is therefore desirable that two or three simple remedies should be at hand. I subjoin two formulas, and two only, as I believe that a multiplication of popular remedies tends to create confusion and to divert attention from the only safe and rational course, which is, as early as possible, to seek for professional advice.

In the milder forms of diarrhœa, I recommend,—

Grey powder (Mercury with chalk) five grains.
To be taken every six hours.

In severe or more obstinate forms,—

Dilute Nitric Acid, ten drops.
Laudanum, two drops.
Water, two table-spoonfuls.
To be taken every four hours.

For children, the above doses must be proportionately lowered according to the age, and it should be observed that it is not safe to give opium in any form to very young children, except under medical superintendence.

Every facility should be given for enabling any one seized with looseness in the bowels to obtain these remedies without delay.

On a former occasion I acquiesced in the system of giving

certain formulas to the druggists, which they were empowered to dispense to applicants. Experience and reflection have led me to disapprove of this practice. The only justifiable plea for administering medicines in the absence of competent advice, is the impossibility of obtaining this immediately. It can rarely be necessary to take more than one or two doses of one of the formulas I have prescribed before medical assistance can be obtained.

The practice, then, of giving formulas to druggists is bad in principle. It is simply giving medical advice vicariously, or at second-hand. It is apt to favour a dangerous security, and lead to the loss of time, which too often *means the loss of the opportunity of doing good.*

All the medical charities should keep these or similar medicines constantly ready. The Poor-Law Guardians should also take care that their medical officers should have adequate assistance to meet the increased calls upon their time.

II. I now proceed to notice those individual means of precaution and personal conduct which should be pursued in order to diminish the risk of attack.

These, great as is their importance, may be summed up in a few words:—Cleanliness and temperance constitute almost the entire code of health. Cleanliness insures a healthy action of the skin, and a healthy action of the skin is essential to the healthy action of the lungs, liver, kidneys, and organs of circulation and digestion. How much, then, does cleanliness imply!

Intemperance is one of the most active predisposing causes of Cholera; a debauch at a period of pestilence is an act of insanity, whether it be regarded by the light of self-preservation, or from the higher ground of moral and religious duty.

Temperance involves strict attention to diet. As a general rule, I believe that temperance must be interpreted to mean good food and enough of it, whilst carefully avoiding excess and all articles of an irritating or unwholesome character. I am persuaded that people should endeavour to keep up a high standard of health by good living.

If there be no absolute prophylactic or preventive against an attack, strict attention to the rules I have laid down will do

much to secure the end in view. But there is one particular means which I think deserves especial notice, for information concerning which I am indebted to Mr. Hannay, of Kew. I refer to the use of flannel round the body. The flannel must first be washed and shrunk, then cut lengthwise of the cloth, in order to form a belt from eight inches to a foot in width. The two ends must overlap six inches at least, to allow for future shrinking, and be fastened with four strings of tape. In addition to this method, which a large experience in the army has proved to be of great value, great care should be taken to keep the feet warm. For this purpose horsehair soles answer most admirably.

A most useful plan to adopt in order to acquaint the poor with the means that are accessible to them, and communicate particular points of advice, would be to draw up a short statement, explaining where they can apply to for assistance in the removal of nuisances, in carrying out other measures of cleanliness, and for medical assistance and advice. These statements should be printed and posted up in conspicuous places, and also be distributed by the visiting sub-committees I have already proposed.

If all the measures indicated above be zealously carried out, it is not presumptuous to anticipate with confidence that when the Cholera approaches the district, it will find us in a state similar to that in which a skilful general at the head of the forces of an invaded country seeks to place it,—namely, showing no point of attack, and *leaving nothing for the enemy to subsist on*. I would not be understood to say that the adoption of the measures proposed to the fullest practicable extent, will secure us an *absolute immunity* from the pestilence, but if we do this, we shall not have to reproach ourselves with having neglected the plainest duty to ourselves and to our neighbours, and we shall certainly be in the best condition to render the disease as little destructive to our population and as little injurious to the general prosperity as possible.

It must surely be unnecessary for me to urge how intimately the prosperity of many of the inhabitants of this district is involved in the reputation for salubrity which it at present enjoys. How clear is the duty and the wisdom of basing that reputation upon undeniable facts! The measures proposed would

not only tend to diminish or prevent the spread of Cholera, but could not fail to do effective service in rooting out the causes of endemic disease, such as fever and other forms of sickness, which are more or less kept up by the present condition of some parts of the district.

But now we have to consider the measures that should be provided during the actual prevalence of Cholera, should it unhappily make its appearance amongst us.

The first and perhaps the most important object, is to provide *Houses of Refuge* to which the sound members of a crowded or infected house or locality may be removed. The effect of this arrangement is twofold. In the first place, it withdraws the persons so removed from the seat and the immediate danger of infection. In the second place, it materially lessens the risk of those remaining behind, by diminishing at once the many concurrent causes of contamination. The beneficial influence of thinning the population of unhealthy districts was strikingly exemplified at Mevagissey, in Cornwall, when the Cholera made its appearance in that town in 1849. Out of 2100 inhabitants, 136 persons died of Cholera. It being found impossible to cleanse and ventilate the place effectually, an encampment was formed at Port Mellon, about half a mile distant. Tents were erected and lofts fitted up; 1300 people were persuaded to leave the town, of whom 452 took up their temporary abode in this encampment. The persons located at Port Mellon were taken from the parts of the town where the Cholera was the most prevalent; yet out of the whole number, not a single case of Cholera occurred. Of those who persisted in remaining at Mevagissey, scarcely one escaped an attack of the disease; so strong is the influence of local causes!

What is the most proper site for these Houses of Refuge? The question is easily answered. It is not necessary to seek them at a distance from the infected localities. Richmond enjoys this remarkable advantage, that it commands a great variety of elevation in a small compass. By simply moving from the low district to a higher locality, almost perfect immunity from the disease may be secured. The influence of elevation on Cholera is remarkable and constant. A very large proportion of the cases occurs on the banks of the Thames, in the districts on a level with the water. Dr. Fourcault lays down,

as the result of a careful and comprehensive examination, that "The cities and villages disposed in an amphitheatre, and when the population is submitted to the same regimen and to the same social conditions, have, in general, presented three distinct zones: the inferior, the most humid, has been the principal focus; in the middle, the epidemic loses a part of its activity; in the superior zone, it is almost or entirely extinguished, according to the elevation, the direction of the mountains, the nature of the soil, and the mineralogical composition of the deep strata."

Mr. Farr expresses the case more tersely. He says:—"The mortality from Cholera is in the inverse ratio of the elevation. The mortality of the nineteen highest districts was at the rate of 33 in 10,000; and of the nineteen lowest districts, 100 in 10,000. The elevation in the two groups was as 71 to 10 feet above the high water of the Thames, or as 7 to 1; while the mortality was as 1 to 3, or in the inverse ratio."

The following Table shows conclusively the truth of this law, and also another fact no less instructive—namely, that the present epidemic is acting in obedience to the same laws as the epidemic of 1848-9.

Mortality by Cholera in the Houses in London at various Elevations.

Average elevation of the Ground in feet above Trinity High Water Mark.	Population 1851.	Deaths from Cholera in the eleven weeks ending Nov. 5th.	Deaths to 100,000 Inhabitants.	
			Observed.	Calculated Series.
Feet.				
350	11,986	0	0	2
60—120	538,973	43	8	8
40— 60	513,588	67	13	13
20— 40	438,193	88	20	19
Under 20	859,496	330	38	38
Under 350	2,362,236	528		

It is clear, then, that the most effectual way of removing from the seat of Cholera will be to remove to elevated ground,

and to accomplish this end it is only necessary to ascend from the low to the high ground of the district.

Cholera Hospitals.—The utility of Cholera Hospitals has been much disputed. It is certain that patients affected with so severe a disease as Cholera can scarcely bear to be removed to any distance with safety. And yet the circumstances of the locality where the Cholera breaks out may be such as to render removal absolutely necessary. I do not apprehend that a special hospital on a large scale will be called for by anything that may arise in Richmond. It is, however, not at all improbable that circumstances may arise to render it advisable to remove particular patients from the houses in which they were attacked. Ample provision for such cases may be provided for by taking an empty house, as airy as possible, not too far distant from the centre of the disease, and situated on rising ground. When it is determined upon to remove a person seized with Cholera, I think it of the utmost importance to enjoin that the patient should be kept in the *recumbent posture*. In the state of nervous prostration attending this disease, simply raising the head is sometimes sufficient to destroy the patient.

I would also observe, that the treatment cannot be effectually carried out in the confined and ill-provided apartments of the poor. Special appliances, as well as free space and air, are necessary.

It will be proper to provide one or more stretchers with cocoa-fibre mattress, and covered with an awning, for the purpose of removing patients.

These should be kept at a place indicated, and easily accessible. By this precaution the necessity of resorting to chairs, or other unsuitable conveyances, would be obviated.

Such are the measures which appear to me to be called for in the present emergency. I conscientiously believe that not a day should be lost in carrying them into effect. The chief scene of action should the Cholera attack us is not a matter of doubt; were we not sufficiently informed by past experience, we have but to enquire what are the spots where typhus occurs, where ague is most prevalent, where febrile affections of every kind assume their most unfavourable type. There is where the allied destroyer, Cholera, will certainly appear. It does not, however,

follow that the more elevated and less crowded districts are absolutely exempt from risk. A person habitually resident in the most favoured locality may visit the dangerous spots, or he may in a variety of other ways be brought into communication with them. The infection, in short, may be transmitted from one place to another.

This consideration should weigh powerfully with the easier classes in inducing them to enter actively and immediately upon the task of aiding their poorer neighbours in diminishing all those local influences which tend to expose the district to the invasion of Cholera. I feel confident, however, that I need not rest the case upon this appeal to personal prudence. Higher and more generous motives will, I am sure, prompt every one who has it in his power, to lend a hearty co-operation in placing the town and the poorer inhabitants, whose lot binds them to the locality, in a strong defensive position. And I venture to express the fervent hope that, under the blessing of Providence, united, well-advised, and well-concerted measures will do much, if not to avert the threatening scourge, at least to mitigate its evil effects.

THE END.

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